

The Planters' Chronicle.

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THE U. P. A. S. I.

(INCORPORATED.)

Contents.

We publish a letter from Mr. Tipping asking for further information about Saltpetre as a means to get rid of stumps, and it is hoped that those who have had experience of this method will publish through this paper their experiments for the benefit of all.

It will be noted that the consumption of Indian Tea appears to be decreasing in the United States. There has been a suggestion that at the end of the War, Indian Teas should be pushed in Eastern Europe.

This week we reproduce two speeches made at the Annual Meeting. Ceylon Planters' Association, lately held at Kandy on the question of Motor Transport in the Island. Some time ago we published a letter from the Assistant Director-General of Supply and Transport on this subject, but without eliciting much support, and it is with the object of renewing interest in the matter that the two speeches are reproduced. We trust if the matter is taken up seriously that the Indian Government will move more expeditiously than the Public Works Department of Ceylon, who have not according to the speakers accorded much support.

At the request of a correspondent, who thinks the matter will be of general interest, we reprint a pamphlet issued by the Board of Agriculture and Fisheries on the subject of Chafer Beetles and white grubs.

The Indian Tea Association have resolved to raise the subscription to two annas an acre to provide funds for the Scientific Department.

We publish, through the kindness of the Economic Botanist of the Government of Mysore, a list of awards made at the late Dassara Exhibition held in Mysore.

We have received through the courtesy of Mr. J. H. Twigg, a summary of the Official Reports on the Metric System, showing that nearly every country has adopted the system.

CORRESPONDENCE.

The Editor,
Planters' Chronicle,
 Bangalore.

Dear Sir,—Being much interested in the subject of use of Explosives in Agriculture and more particularly in any efficacious and practical method of getting rid of undesirable shade trees and stumps, I have read the recent articles and correspondence appearing in your journal with great interest. But there are some points about which I am not clear. From what your correspondent "Colin Hindley" says, in his most interesting letter on the subject (Vol. VIII, No. 8, P. C.,) explosives are not very effective on soft wood stumps. This being so, and many of our shade trees being soft wooded, would he very kindly tell us if saltpetre is effective in all cases, soft and hard, green and dry stumps?

My own experience in trying to burn out hard wood dry stumps was not encouraging, but I would like to try again, with a little more light on the subject.

Some 12 years ago, I undertook some experiments with both saltpetre and turpentine. A number of hard-wooded dry stumps were bored, vertically with 1, 2, and 3 according to size of the stump one inch diameter holes 12" to 15" deep, in the dry weather (April) some of the holes were filled with a very strong solution of saltpetre, others were filled with turpentine and all were tightly plugged up with wooden plugs well hammered in. In September the plugs were taken out and the hole again filled and plugged up as before. In the following April, after removing a little of the surface soil round the stump, fires were lighted, but beyond using up a good deal of fire wood, and burning out some of the adjacent coffee trees, there was little result and the stumps would have been there to this day, had they not been jacked out.

I had followed out, carefully, all I had read on the subject and was naturally very disappointed at the result. Can you or any of your readers tell me where I went wrong?

Yours faithfully,
 (Signed) PERCY G. TIPPING.

The Government of India having decided to continue the Indian tea cess for another lustre, without, as far as we are aware, altering the terms of the charter. Mr. R. Blechynden, the Indian Tea Commissioner in U. S. A., will be given another chance to justify his existence and evangel. From his latest report he does not appear to have any notion of shifting his plith from St. Louis, although shrewd critics say that he would be much better employed in stumping quite another part of the country. The tea trade in U. S. A. is very dull, and the consumption per capita shows signs of decreasing. It is quite heroic of the Indian Tea Industry to spend £10,000 or more a year to rouse our American cousins to a sense of their deficiencies in the appreciation of wholesome beverages.—*Capital*.

MYSORE DURBARAH EXHIBITION, 1912.

Mr. Krumbeigel, Economic Botanist to the Government of Mysore, informs us that the following prizes have been awarded to the exhibitors who sent exhibits under Plantation and Garden products at the Exhibition of 1912:—

No.	Name and Address.	Nature of exhibit to which award is made.	Date of despatch of Certificate.	Date of despatch of Medal.
GOLD MEDALS.				
1.	The Maryland Tea Company, Nilgiris ...	Tea	18-1-1913	
2.	The Superintendent Glenmary Estate, Nilgiris ...	Tea	11-2-1913	
3.	Messrs. Matheson & Co., Hunsur ...	Coffee	6-1-1913	18-1-1913
4.	The Eldorado Estate, Mundakayam ...	Hevea Rubber	12-2-1913	
5.	The Cochin Rubber Co., through Mr. R. deRoos Norman ...	Collection of rubber and rubber seeds	16-12-1912	10-12-1912 No. 2306 dated 13-12-1912
SILVER MEDALS.				
1.	The Travancore Rubber Co., Pará	Rubber	3-1-1913	14-12-1912
2.	Mr. F. L. Hamilton, Kador	Collection of Coffee	7-2-1913	17-12-1912
3.	Mr. W. H. Reed, Kador	Cardanoms	do.	do.
HONOURABLE MENTIONS.				
1.	Messrs. Baily and Brock, Nilgiris ...	Coffee	8-1-1913	
2.	Mr. Ashley, Ashley Estate, Peernade ...	Tea	9-1-1913	
3.	Mr. Large, United Planters' Association, Bangalore ...	Aloe fibre	18-1-1913	

SOUTH INDIAN PLANTING.

At the last meeting of the Madras Legislative Council, an Hon'ble Member asked the Government to state the total number of persons registered in 1910-11 and 1911-12, and the six months of the current year in each of the six northern districts of the Presidency, in which the Assam Labour Act IV of 1901 was in force. The Government replied that they had no precise information regarding the number of persons registered under the Assam Labour and Emigration Act, 1901, during the periods referred to. The total number of persons (including dependants) recruited during the years 1910-11 and 1911-12 in the six districts were:—

	1910-11	1911-12
Ganjam ...	1,820	4,169
Vizagapatam ...	923	1,454
Godavari ...	75	252
Guntur ...	85	63
Nellore ...	Nil	72
Kistna ...	Nil	20

The Government also said that they were not in possession of figures for the current year.—*Capital.*

THE PLANTERS' ASSOCIATION OF CEYLON KANDY.

ANNUAL MEETING.

The following are the extracts taken from the Ceylon Planters' Association :—

RECRUITING IN INDIA.

The Secretary then read out the following telegram received from Mr. Scobie Nicholson, the Ceylon Labour Commissioner in India :—

"I am glad to report for the information of your general meeting that recruiting figures to date show an improvement of 15 per cent. over last year in spite of a satisfactory harvest. Further efforts should be made to recruit labour from the coast during the year, and new districts not already tapped should be exploited."

The announcement was received with applause.

MOTOR TRANSPORT.

Mr. M. L. Wilkins then proposed the following resolution :—

"That this Association respectfully calls the attention of Government to the fact that a more reliable and up-to-date form of transport has become an urgent necessity; that the progress and development of this Colony is in serious danger of disorganisation owing to epidemics among transport cattle; and that if motor vehicles, run as feeders to the railway, are not feasible, at least individual effort and private enterprise should be encouraged."

He said that at the Committee meeting held in the morning he was requested to add to that resolution the following :—"And that Government be respectfully asked to receive a joint Deputation from the Planters' Association and the Chamber of Commerce to confer with them on the matter." He asked the permission of the meeting to add that to his resolution.

Permission being accorded, Mr. Wilkins said he thought it was hardly necessary for him to enlarge upon the importance of that subject, and if any of them in a comfortable position with regard to transport had any doubt of it he would advise them to ask some of their brother planters in Uva. Rinderpest, he believed, had been known for some years in Ceylon, and the history of rinderpest in other countries, so far as he had been able to ascertain, was that it died out and recurred again, and each recurring attack was nearly always worse than the last one. The last attack in Natal culminated in the wiping out of something like 97 per cent. of the affected cattle. In addition to rinderpest they had had lately in Ceylon outbreaks of surra, foot and mouth disease and anthrax. He thought if they were to go into the conditions which had to be contended with in fighting epidemics of that kind they would find that they were about as bad as they could be. There was the geographical position of the country; districts were very scattered, and it was extremely difficult to surround or isolate them. In addition to that they had in practically every district a certain amount of scrub and jungle which harboured pig. The animals contracted rinderpest and spread the disease, and they had in them an absolutely uncontrollable method of spreading the disease. Then they had

STRAY CATTLE.

which Government had failed, utterly and absolutely to control; and they were to be found in thousands all over the public roads of Ceylon. On

top of stray cattle and pig they had the headman system of Ceylon, (Laughter). They all knew that there was a certain magic substance known as palm oil, and palm oil would allow cattle into affected areas, out of affected areas, would open doors and do all sorts of marvellous things. (Laughter). And, finally, they had Government machinery, which was about the most cumbersome machinery they could imagine. The Government Agent informed the Ratamahatmaya, the Ratamahatmaya informed the Korale, the Korale informed the Arachchi, the Arachchi informed the Vidane, the Vidane informed some one else, and by the time all these officials had been made acquainted with the state of affairs an outbreak of rinderpest had spread and had got beyond control. He thought when they took those conditions into consideration that he was justified in saying that the reason why their cattle had not been wiped off the face of the earth was due more to jolly good luck than to good management. (Applause). It was necessary for the success of any enterprise, any business, or any individual that it should be up-to-date and progressive, but yet with regard to the question of road transport he believed that their position was exactly the same as in

THE DAYS OF THE KANDYAN KINGS.

or he would go further and say in the days of the Kings of Anuradhapura, probably 250 B. C. In 1909 and 1910 they had a little experience of rinderpest in his old district, north of Kandy, and about 50 per cent. of their draught cattle died and his Association, of which he then happened to be Chairman, took up the matter and formed a deputation to wait on His Excellency the Governor, in Kandy. He (the speaker) had great pleasure in saying that they were most courteously and sympathetically received by the Governor, who went into the whole question of mechanical transport with them very carefully. He was perfectly convinced that there was no man in that room who was keener on motor traction or more up-to-date traction than their late Governor. (Applause). He had a remedy for all the practical difficulties that they could bring forward. They pointed out the narrowness of the roads and they asked him about the difficulty of passing over the bridges, and he had more or less a good sound remedy for over-coming every one of them, and he was absolutely convinced that it was through no fault of Sir Henry McCallum that they had not got a better form of traction today. The Governor on that occasion told them that the Director of Public Works was going home to find a suitable motor lorry. They knew something about the question of motor transport, but they did not know everything, but they were possessed of the knowledge that the responsibility for the extraordinary inaction in the matter lay somewhere between the Director of Public Works and the Crown Agents for the Colony. (Applause). He did not quite know what the policy of the P. W. D. was in that matter, but he knew a good number of other Departments whose policy was best expressed in the words of the prayer "Give us peace in our time, O Lord" (Loud Laughter). He thought that the great mistake had been that the whole thing was a one-man show. He thought it was a great pity that only one man—the Director of Public Works was sent home to find a suitable lorry. He thought that it should have been put in the hands of a Committee and if they had had on that Committee a few Ceylon Planters, he thought they would have had some lorries on their roads at the present time. (Applause). The policy at present appeared to be

A DOG-IN-THE-MANGER POLICY.

They would not help them and they would not let them help themselves. He would not mention names, but they were informed in Committee the other day of an incident which occurred not very far from there.

planter acquired a lorry, but he was not allowed to use it and the only way he could get it to his factory was by re-building a culvert on his road at the estate's expense. He thought that that was a good example of the lack of encouragement on the part of the Government. (Cries of "Shame.") It was quite possible that the deplorable state of the Badulla-Bandarawala road might be brought forward as an example of what motor lorries would do to roads, and it was quite possible that that fact might stop progress. He liked to answer any argument that might be brought forward from a commonsense point of view. (Applause). It was quite possible that the form of lorry used there was not suitable to Ceylon, but as a matter of fact he knew that lorries of a similar type were working satisfactorily in other parts of the world. Secondly, those lorries were running in a district subject to only one monsoon a year and, therefore, efficient road repair could only take place once a year. Thirdly he thought there must be a limit, and a definite limit to the carrying capacity of any road and if they exceeded that capacity—he did not care what form of traction they used—the road would probably give way. When the tonnage reached a certain point he thought they had a good case for railway and that had been abundantly proved in the case of Badulla. He had merely to mention that Government had sanctioned a railway there in spite of great geographical difficulties. He did not believe that any form of transport—cart, motor or anything else, could compete with a legitimate railway. Another point on which they could accuse Government of at least a little inconsistency was that their various Departments did not work together properly. Take, for instance, the Agricultural Department of which they had just heard something. It was a large Department for which a large sum of money was voted. They were informed of the best methods of cultivation, which in plain words simply meant more manure and more produce. Whatever efforts that were made in the one direction were nullified for want of facilities to bring up that manure and to remove that produce. He did not wish it to be imagined that he was wedded to any particular form of mechanical transport. He was not there to advocate lorries or wire ropeways or anything of that sort. Each case would have to be considered on its own merits and he had no doubt that in some districts they would best be met by railways, in others by wire trams, and in the case of short distances by motor lorries. The main thing was that they wanted

SOMETHING BETTER THAN BULLS.

Another aspect of the case, which he thought would appeal to their better feeling, was the humane question. He was only stating the plain truth when he said that they could not go for a journey of one hundred miles in any direction from that room without finding bulls with sore necks, broken tails, overloaded and showing other signs of ill treatment—a state of affairs that might be expected in Afghanistan or Chiga, but which no one expected to find, or to be tolerated, in a British Colony. They would probably be told that "God helps those who help themselves," but if he might amend that saying he would conclude with the exclamation that "God help us if we wait for the P. W. D." (Loud Applause).

AERIAL TRAMWAYS.

Mr. W. R. Biddulph who seconded, said he did not think there was very much for him to say on the question after all they had heard from Mr. Wilkins on the subject. He had dealt with all the points of any importance but it seemed to him that where must be some other reason besides the obstinacy of the Director of Public Works that had prevented His Excellency the Governor from successfully battling with and defeating

the difficulty of transport during his five-years of administery of the Colony. It seemed to him that it was the roads themselves that were not and never would be fitted to the transport that it was suggested should be put up in them. It seemed to him that the proposal they had seen lately put forward in Maskeliya and other districts for aerial tramways was one that was well worthy of consideration, not only on account of the efficiency of such means of transport, but also because it would take off the roads a great deal of traffic that proved very expensive for the roads to meet. He believed that he was right in saying that some Rs.700 a mile was saved on one road, after the railway opened, where the traffic was very heavy. The cost of up-keep dropped from Rs.1,000 per annum to Rs.300 per annum. That was a matter to be considered when the time came. The main point was that they should be able to impress upon His Excellency the Officer administering the Colony to-day the importance of that question, and he was sure that the members who would be suggested to them would be the best possible people to put the case fairly and properly before His Excellency.

Mr. W. Sinclair, who supported the matter was simply that there were not bullocks in the country sufficient to cope with the transport at present on the estates. At one time they could purchase a pair of very good bulls for Rs.250. They would not be able to buy those bulls now under Rs.500. He had gone into the question of the up-keep of cattle very carefully and he had run carts himself, but he would never attempt to do so again. He would rather supervise 600 acres of tea land than supervise six carts. (Laughter). The trouble and inconvenience that one was put to was very considerable, and in addition to that the bulls were ill-treated in every possible way. Their transport at the present moment was 67 cents per ton per mile. That meant that at the very outside a cartman could make per week per cart from Rs.8 to Rs.10. Rinderpest came along, he lost a pair of bulls, and he was immediately Rs.500 to the bad. When that state of affairs comes about transport must come to a standstill, and they were at present on the verge of that. At the present time there was

A BREAKDOWN ON THE RAILWAY

and a great many carts had gone to other districts where they were highly paid, and the result was that in their district they were hardly put to obtain rice for their coolies. In addition to that he might say that the villagers immediately below him where practically starving. They were unable to obtain food for their daily requirements, and he had had himself to supply them with rice during the past fortnight. He had offered them work on the estate and he had offered them cash, but they said they did not want cash. "What is the use of it?" they said, we want rice, and if you cannot give it to us we must go hungry." The result, was that he had issued rice to them in small quantities for which they were exceedingly grateful. Now with the non-paying business of carting it was absolutely necessary that some other means of transport should be brought forward. The Rangalla district foresaw that in 1909 and they requested His Excellency the Governor to receive a deputation on the question, which he did in May of 1909. In January, 1910, he visited the district and he saw their road, and he said that so far as he could see there was nothing the matter with the road, and that all that was required was a few sidings for the purpose of enabling their carts and other traffic to pass. He called upon the Provincial Engineer to send in a report as to how much that would cost, and he thought he was correct in saying that the amount was put down at Rs.8,500. Very well. They then came to the point as to who should pay for that. They were agreeable that a certain amount should be added per ton to cover the expense. It was not very much per ton and they agreed to it. The Gov.

error said that they were the first to come to Government on the matter, and that therefore, they should be the first to receive the first motor lorry that was capable of travelling on their road, and he would give instructions that that should be carried out as soon as possible. He (the speaker) would tell them how quickly that had been done. The incident he referred to happened in January, 1910, and they had not received any further information on the subject except to say that lorries were being experimented with and that as soon as one was got it would be sent up. They heard nothing more on the subject at all. He went home in 1911 and in November 1911 he asked His Excellency the Governor if he would kindly let him know where the motor lorries were being constructed. He told him—he did not think he should mention names as it might lead to trouble—where they were being built. He went to see the builders and he asked them if they had received an order from the Ceylon Government for the construction of two motor lorries. They said they had and he thereupon asked where they were. They replied that it was

RATHER A FUNNY BUSINESS.

They said that some eighteen months ago a gentleman was deputed by the Ceylon Government to see them on the matter. They could not tell him who it was, but it was supposed to be the Director of Public Works or someone of that description. (Laughter.) They were put to considerable inconvenience to show that gentleman every possible type of motor lorry they could find, and after a considerable trouble he said he would let them know soon which type he required. They told him (the speaker) that eighteen months elapsed before they got an order for a lorry. They wrote back and said that the lorries that they had shown then were absolutely ancient and they had scrapped all the specifications and they would strongly advise the Ceylon Government to go in for something better which they were then constructing. The gentleman wrote back and said that he would take nothing except the one he tried eighteen months ago. (Laughter.) Very well. They said that they recovered the orders and specifications from the scrap heap and began to make one. That was in November 1911, and this year the Colonial Secretary wrote to say that the motor had not arrived from England yet. (Loud Laughter.)

Mr. Sinclair said that they would see, therefore, the difficulties that faced them in getting Government to move in the matter. Personally he did not blame His Excellency the late Governor at all in the matter. He was exceedingly keen—no one could be keener in the matter—and he gave every possible grain of information with regard to what should be done, but he was not surprised at his getting ill if his undertakings put everything possible in his way to prevent things from being carried out. (Applause.) He believed that His Excellency the late Governor had written before his departure from the Island regretting very much that he had not been able to see motor lorries working on the Rangalla road. (Applause.) With those few remarks he had much pleasure in supporting the resolution.

SUPPORT FROM MASKELIYA.

Mr. Hew Kennedy, who was asked to speak on the matter in view of the great interest he takes in mechanical transport, mentioned that he had not prepared a speech, but would very strongly support the resolution. Really he did not think that he ought to speak after the excellent speeches that had been made. They could not let that occasion pass without saying that Government must be made to move. If they would not move, the whole weight of the gentlemen in that room must be put against them and then they must move. (Laughter and hear, hear.)—*The Weekly Times of Ceylon.*

BOARD OF AGRICULTURE AND FISHERIES.**Chafer-Beetles or White Grubs.****The Large Cockchafer (*Melolontha vulgaris*)****DISTRIBUTION AND PLANTS ATTACKED.**

In the majority of districts in Great Britain "Chafergrubs" or "White-grubs" are more or less abundant. The damage they do in the larval or grub state is often very serious, but is perhaps more frequently attributed to the work of the wire-worm. Not only do these insects cause loss to the farmer, gardener, and forester by damaging the roots of plants when in the grub stage, but much harm is also done by them when they appear as adult beetles. The beetles feed on the leaves of various forest trees, occasionally quite stripping them of their foliage, particularly broad-leaved species, although conifers are also attacked. Fruit trees are occasionally attacked by them, as also grass, corn, peas, and many vegetables. It has usually been supposed that this loss is due to the Large Cockchafer (*Melolontha vulgaris*), but this large chafer is no more abundant and harmful than two smaller species known as the Garden-chafer Bracken-clock or Coch-y-bonddu (*Phyllopertha horticola*), and the Summer-chafer (*Rhizotrogus solstitialis*).

These insects are much more abundant and destructive in France, Germany and other parts of Europe than in Great Britain; but as during the past ten years they have very materially increased in this country, farmers and gardeners should guard against them wherever possible. The grubs feed on almost any roots, but are particularly prone to attack those of grass and seedling trees. Young oaks and pine-trees often suffer severely both in this country and on the Continent. The grubs, bite the roots, thereby checking the growth of the plants and frequently killing them outright. In grass land, the grass may often be seen dying from the ravages of these pests. Rooks are very fond of white grubs, and are attracted to the fields to feed on them. These useful birds are often unjustly accused of injuring the grass plants, whereas they are really feeding on the chafer-grubs which destroy the grass. The beetles are perfectly easy to distinguish from one another, but the grubs of all three are very similar when young, and can only be identified by microscopic examination. This is a somewhat important matter, as there is a difference in the life-histories of the three species in regard to the time of appearance of the adults and the duration of the grub stage. It is important to notice the time of appearance of the adult beetles, as the pests are then easiest to destroy; they are very difficult to combat when in the grub stage in the ground, especially in grass-land.

DESCRIPTION.

(1) The *Large-chafer*, usually called the *Cockchafer*, is often an inch in length, with head and front portion of the body black, the wing covers (elytra) being reddish-brown, hairy, and with five raised lines on each; along each side of the abdomen are five white triangular marks. The abdomen ends in a prolongation, downwardly curved, and not covered by the elytra. The end joints of the antennae form a kind of club, made up in the male of seven leaves and in the female of six.

(2.) The *Summer-chafer* is somewhat smaller, being about two-thirds of an inch long, of a general reddish-brown or yellowish colour, the colour varying. The wing covers have each four raised lines. Fresh specimens are distinctly hairy, and the club at the end of the antennae has three leaves, both in the male and the female.

(3.) The *Garden chafer* varies from one-fourth to one-half of an inch long, the front part of the body is of a metallic greenish colour, and the wing cases of a reddish-brown hue; the male is very hairy.

(4.) A fourth species of chafer is *Cetonia aurata*, the *Green Rose-chafer*. This beetle measures two-thirds of an inch in length, and is golden green above; the wing-covers are marked with white specks and streaks.

The garden-chafer appears in June, and July, and the summer-chafer about the same time, whilst the large or cockchafer usually occurs in May and June, as also does the green rose-chafer. There are slight differences in the times of flight according to weather conditions.

The grubs are thick, fleshy, and dirty-white, the tail end of the body being swollen and darker in colour; the head is large and brown, the mouth being armed with strong mandibles, which vary somewhat in each of the three species; there are also three pairs of jointed legs on the front of the body. These white grubs lie with their bodies bent, and although sluggish when taken out of the soil, are comparatively active when in it. In habits and external appearance the larvae are very similar, but when full-grown there is a marked difference in size: the grubs of the cock-chafer and the green rose-chafer reach one-and-a-half inches in length and are thicker in proportion than those of the garden-chafer and the summer-chafer; which, when full-grown, are distinctly smaller.

The grubs can be further distinguished from one another by the following microscopic characters seen in the mandibles:—In the large-chafer the mandibles have a granulated area where the light and dark parts of the jaws unite; in the summer-chafer the whole surface is very minutely granulated; in the garden-chafer there is a pale oval area with file-like ridges across it. The cock-chafer grub can be further distinguished from the garden-chafer grub by the fact that the claws of its front pair of legs are longer than those of the second pair, and those of the second pair longer than those of the third pair, whereas in the grub of the garden-chafer the claws of the front pair of legs are shorter than those of the second pair, and those of the second pair shorter than those of the third.

The larvae of the green rose-chafer resembles that of the cock-chafer but has a large rusty spot on each side of the first segment behind the head; its feet, too, are pointed, and the body is covered with transverse rows of short hairs.

LIFE HISTORIES.

The Cock-chafer.—The female burrows into the earth and lays her eggs, 12 to 30 at each laying, and near one another, and up to 70 in all. After five to six weeks the larvae hatches out. No great damage is done till the second summer, when the grubs gnaw the roots of grass and agricultural plants and seedling trees, the feeding being continued during a third and a fourth summer, when the grub becomes a pupa in the soil, but the beetle does not appear above ground for egg-laying till the next May, i.e., a new generation of beetles may, in our climate, be expected every four years. The cock-chafer flies towards night, resting sluggishly during the day on trees.

The Summer-chafer has a similar life-history, but the grubs are destructive more to agricultural plants than to young trees. The beetles rest in the day time and fly in the evening. They sometimes appear in thousands. There is not complete agreement as to the length of the life cycle, but very probably it can be completed in one year. The swarming of the adults lasts for only a few weeks, and may, under similar weather conditions, be expected at the same time in the next year.

The Garden-chafer.—This beetle flies in the bright sunshine, and often in great swarms. The mature beetles strip trees of their leaves, and are destructive to turnips, peas, and garden plants, e. g., roses. Young fruits are also attacked. The grubs are especially harmful in grass land, the roots being bitten through. There is one generation during the year.

The Green Rose-chafer also flies in the day time in bright summer weather, resting sluggishly during dull days. The adults are harmful to leafage and especially to flowers, e. g., strawberry and other rosaceous plants, turnips, &c.,—the stamens of flowers being destroyed by the biting off of the anthers. An interesting point as compared with other beetles is that during flight the wing covers of this species are not spread, but only slightly elevated so as to allow the spread of the two hind or flying wings. The eggs are laid in the ground, in rich garden soil; the grubs have also been taken from the rotting wood of tree stumps. Pupation takes place under cover of a cocoon of earth the exterior of which is rough. Two or more years may be required to complete the life cycle.

In certain years these beetles are noticed to be more abundant than usual. These "chafer-years" are fairly regular, occurring every fifth year where the large-chafer is commonest, and every year where the garden-chafer and summer-chafer are most prevalent. It is very important to note the year in which these creatures occur in great numbers, because the next brood can be foreseen and steps taken to destroy the beetles at once. It has been noticed that these insects are somewhat local although wide-spread, certain fields being attacked time after time while neighbouring fields are quite free from infestation.

METHODS OF PREVENTION AND REMEDIES.

Remedial measures are most effective during the beetle stage, hence the importance of having accurate data in regard to "chafer" years.

(1.) The best way of preventing the injury caused by these insects and their grubs is to destroy the beetles when they appear upon trees, &c., in the early summer. In France and Germany systematic warfare is waged against these pests, and it is only in this way, and by concerted action on the part of the farmers, that any real benefit will accrue in districts where chafer larvae are very harmful. A single farmer on a Mayenne estate in France collected 2,000 lbs. of cock-chafer in the summer of 1889, and as each female may lay as many as sixty to seventy eggs the importance of such wholesale destruction is self-evident. In destroying and collecting the beetles, it should be noted which is the abundant chafer in the neighbourhood. If it be the cock-chafer or the summer-chafer then it must be attacked in the day time, especially during bright weather; and when the weather is dull, or late in the day, if it be the garden-chafer or the green-rose-chafer, for these are day fliers and often very active in the sunshine.

(2.) The beetles may be beaten down on the tarred boards from the trees and shrubs by means of long sticks, or they may be collected into sacks, and killed. This should be done, in the case of the cock-chafer and summer-chafer, during the day, when the beetles are very sluggish, and when they are found clinging to the lower surface of the leaves. If they are shaken on to the ground, pigs may be employed to destroy them as they are greedily devoured by these animals.

The beetles are best sought for on isolated trees and bushes, as they are said to go into woods only in bad weather. The trees should not be too vigorously shaken, or the beetles may fly away instead of falling down,

Attention must be paid to the kind of beetle to be reaped on account of the different times of appearance.

(3.) Trapping the larvae has also been resorted to with marked success. For this purpose, pieces of turf from eight to twelve inches broad and six to eight inches thick are laid with the grass downward, on the surface of the ground. The larvae collect beneath the turf. Heaps of turf, humus, dung, &c., may also be employed as larval traps.

(4.) When the grubs are working in the soil, gas-lime and kainit as "top dressings" have been found of benefit. On pasture land, where the attack is worst of all, a heavy dressing of gas-lime has frequently been used, and is found to kill the grass and the grubs. This seems too drastic a measure; but it must be done thoroughly if any good is to ensue and the grass grows strongly the following year, almost too strongly according to one report (Ann. Rept. Zool. R. A. S. E., 1894). Dressings of kainit at the rate of 5 cwt. to the acre have been known to do much good on grass land, as has also basic slag at the same rate. The effect of all these dressings, however, depends entirely on the weather conditions. Kainit has a decidedly injurious effect upon soft larvae; basic slag probably only acts as a stimulant to the plant.

(5.) In the case of corn and pulse crops frequent horse side-hoeing does some little good, and in the case of garden cultivation soot and lime have been freely employed, but in the latter case hoeing and hand-picking are preferably recommended. Frequent reports are received regarding the garden-chaffer on strawberry roots, but little can be done to rid the plants of this pest in the summer. Dressings of kainit, however, or a heavy dressing of soot, might be tried in the early spring.

(6.) The rook, starling, green plover, and the black-headed and common gulls should be encouraged, as they devour large numbers of white and other grubs. The two birds last-mentioned often occur far inland, and may be seen following the plough and greedily picking up any larvae that are thrown up. The adult chafers are eaten in large numbers by owls and night-jars. Bats also eat them, and moles hunt in the ground for the grubs.

(7.) Attempts have been made in France and Germany to destroy the chafer larvae by infecting them with fungoid diseases. Two species of fungi have been experimented with—*Botrytis tenella* and *Isaria densa*. Infection is communicable by means of living infected grubs, but not by dead ones. The results are at present not sufficiently satisfactory to warrant the extensive employment of this method of destroying the larvae.

4. Whitehall Place, S. W.,

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* At the annual meeting of the Indian Tea Association on Friday last it was unanimously resolved to raise the rate of subscription for the current year to two annas per acre under tea cultivation. The object of this increase is to provide additional funds for the Scientific Department, which so far has been unable to convince the planters that it has done them useful service. One would think that it would be much better to spend £10,000 a year on scientific investigation and experiment than to throw it away in advertisements in American papers which fail to set the fashion in tea. —*Capital*.